

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the embodiment of claim 5 in which a fiber is placed crosswise to itself must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. Claims 1-12, 14-17, 20-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. It is not clear what is intended by "terminal part...is exposed through the first supporting plate" in that in applicant's arguments, Figures 2, 4 and 5 are cited. It appears from the arguments that applicant means to recite that the terminals of the fibers extend beyond the plate.

1.

2. Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

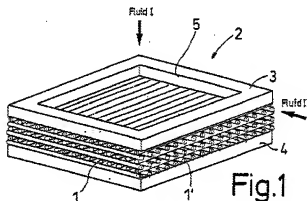
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

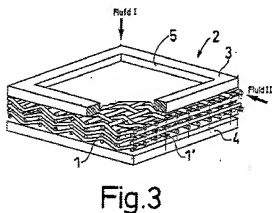
2. Claims 1-2, 4, 6-9, 12-13, 17, 20-21 rejected under 35 U.S.C. 102(b) as being anticipated by Durst et al. (DE 4308697).

3. With respect to claim 1, Durst et al. teaches a upper frame part (3, fig. 1) (first supporting plate) and a least one capillary hollow fiber (1) (hollow filament) constituting the channel of the microfluid system, wherein the capillary hollow fiber (1) (hollow filament) is placed on the upper frame part (3) (first supporting plate) in any shape, and a particular internal region of the capillary hollow fiber (1) (hollow filament). With respect to "a function," Durst teaches the use of the polysulfone fibers of Ly (4970034). Polysulfone is inherently hydrophobic [Ly, col. 3, lines 37-51] and inherently has the function of adsorption/desorption (Strano, 2003/0034295, [0095, 0128], Table F). Further, Durst teaches the movement of one component from one

flow stream into another based on concentration or pressure gradients (p. 1, lines 6-19, page 3, paragraph 2), which constitutes "removal" from the first stream and "partitioning" between the two streams. Further, Durst teach "pure physical absorption" (p. 1, lines 15-19), which at least constitutes removal, and may actually refer to adsorption. As shown below, the terminal portions of the fibers are exposed at the edge below the plate, thus, "through" the lower edge of the plate.



4. With respect to claim 2, Durst et al. teaches more than one capillary hollow fiber (1) (hollow filament) are placed (fig. 1).
- 5.



6. With respect to claim 4, Durst et al. teaches at least one capillary hollow fiber (1) (hollow filament) is placed crosswise to at least another capillary hollow fiber (1) (hollow filament; placed crosswise the capillary hollow fiber (1) (hollow filament) itself (fig. 1, fig. 3).

7. With respect to claim 6, Durst et al. teaches a lower frame part (4) (second supporting plate), wherein at least one capillary hollow fiber (1) (hollow filament) is held between the upper and lower frame part (3, 4) (first and second supporting plates) (fig. 1).

8. With respect to claim 7, Durst et al. teaches part of at least one capillary hollow fiber (1) (hollow filament) is exposed through at least one of the upper and lower frame part (3, 4) (first and second supporting plates) (fig. 1).

9. With respect to claims 8, Durst et al. teaches at least one hollow filament has a inlet and discharge openings (port) for at least one of receiving a fluid from outside and discharging it to the outside (page 14, lines 10-23).

10. With respect to claim 9, Durst et al. teaches the inlet and discharge opening (5) (port) is fixed to (at least one of) the upper frame part (first and second supporting plates). See, e.g. Fig. 4.

11.

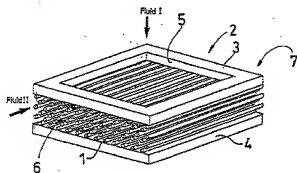


Fig.4

12.

13. With respect to claim 12, Durst et al. teaches the membrane modules are covered by a cylindrical housing light (light transmitting property) the capillary hollow fibers penetrate the housing. It appears the capillary hollow fibers of Durst et al. would meet this limitation (10, lines 20-29).

14. With respect to claim 13, Durst et al. teaches the function of the capillary hollow fiber (1) (hollow filament) is a function selected from a group consisting of separation (adsorption-desorption, ion exchange, removal, partition and oxidation-reduction) (page 1, lines 7-11).

15. With respect to claims 17, Durst et al. teaches at least one hollow filament has an inlet and discharge openings (port) for at least one of receiving a fluid from outside and discharging it to the outside (page 14, lines 10-23).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Durst as applied to claims above, and further in view of Mathewson (5236665) and/or Kalthod (5779897).

4. Durst fails to teach an inert hollow fiber.

5. Mathewson and Kalthod each teach providing inert fibers between or woven through functional hollow fibers to support the fibers and distribute flow.

6. It would have been obvious to provide inert fibers in the device of Durst in order to support the functional hollow fibers and distribute flow as taught by Mathewson and/or Kalthod. In that any suitable inert fiber can be used, it would have been obvious to use inert hollow fibers, e.g., in order to use less material than solid fibers and/or in order to use an available inert fiber.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Durst as applied to claims above, and further in view of McNamara (3702658).

18. Durst fails to teach a fiber crossing itself.

19. McNamara teaches that as an alternative to fibers extending through a housing, they may be bent back on themselves to provide inlet/outlet at one end of the housing (Figs. 1, 2).

20. It would have been obvious to bend the fibers of Durst back on themselves so as to provide an alternative configuration to fibers extending through a housing as taught by McNamara.

21. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Durst et al. (DE 4308697) in view of Wolk (US 6,148,508).

22. With respect to claim 10, modified Durst et al. does not specifically teach a relay unit for connecting the hollow filaments to each other. However, it appears the capillary hollow fibers of Durst et al. are connected to each other, which would meet this limitation (fig. 1, fig. 3). Wolk teaches a capillary element (438, fig. 4B) (relay unit) for connecting the capillary channels (440) (hollow filaments) to each other. It would have been obvious to one of ordinary skill in the art that the insertion of the capillary element into the opening places the capillary channel into fluid communication with at least one of the channels in the integrated channel network within the body structure (col. 6, lines 3-7) as taught by Wolk. The capillary element (relay unit) of Wolk, has a channel disposed through it, which connects it to a channel network (hollow filaments) (col. 2, lines 36-43).

23. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Durst et al. (DE 4308697) in view of Frazier et al. (US 7,048,723).

24. With respect to claim 11, Durst et al. does not specifically teach a metal layer is formed on a particular region of at least one hollow filament. Frazier et al. teaches a coating such as gold (metal layer) is formed on a particular region of at least one microneedle (hollow filament) (col. 4, lines 44-52; col.7, lines 9-12). It would have been obvious to one of ordinary skill in the art to modify the device of Durst et al. to provide a gold layer on a region of the hollow filament given the teaching of Frazier et al. in order to passage of an electric current via flash electroplating (col. 7, lines 9-24) as taught by Frazier et al.

25. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Durst et al. (DE 4308697) in view of Anderson et al. (US 2002/0015952)

26. With respect to claims 14 and 16, Durst et al. does not specifically teach fixing a filler in a particular internal region of at least one hollow filament; the function is provided by forming a porous material in a particular internal region of at least one hollow filament. Anderson et al. teaches the function is provided by beads are packed (fixing a filler in a particular internal region) in the hollow fiber (hollow filament) (par. 0174, lines 1-3; lines 7-8). Anderson et al. further describes the beads as being made from silica or gel beads and porous polystyrene (par. 0058, lines 5-10). It would have been obvious to one of ordinary skill in the art to modify the device of Durst et al. to fix beads (filler) in a particular internal region of the hollow filament (par. 0174, lines 4-5) as taught by Anderson et al. in order to adhere different fibers together (par. 0174, lines 3-4).

27. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Durst et al. (DE 4308697) in view of Kitaguchi et al. (US 6,148,508)

28. With respect to claim 15, Durst et al. does not specifically teach graft polymerization on a particular internal region of at least one hollow filament. Kitaguchi et al. teaches function is provided by graft polymerization on the inner surface of the capillary (a particular internal region of at least one hollow filament) (par. 0250, lines 8-11). It would have been obvious to one of ordinary skill in the art to use graft polymerization to produce stable electroosmosis flows (par. 0250, lines 6-9) as taught by Kitaguchi et al.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

29. Claims 1-11 provisionally rejected on the ground of nonstatutory obviousness-

type double patenting as being unpatentable over claims 1-6, 8 of copending

Application No. 10/505,416. Although the conflicting claims are not identical, they are

not patentably distinct from each other because they are both claiming a microfluid

system comprising a first supporting plate, at least one hollow filament. The

limitations of claims 1-11 are encompassed within the claims of 10/505,416.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The reference Nichols (US 4, 959, 152) teaches a hollow fiber separation module and method for the use thereof.

The reference Hoopman et al. (US 5, 070, 606) teaches a method for producing a sheet member containing at least one enclosed channel.

The reference Sarrut et al. (FR 2813073) teaches Device for biological, chemical pharmaceutical and medical uses, comprises channels and a reception area for guiding and positioning capillaries to connect to a micro-fluidic component.

The reference Kawazoe et al. (US 10/505,416) teaches micro fluid system support and manufacturing method thereof.

The reference Tzeng et al. (TW 536524B) teaches a network-type microchannel device for micro-fluid.

1. Applicant's arguments filed May 4, 2010 have been fully considered but they are not persuasive.
2. With respect to "a function," Durst teaches the use of the polysulfone fibers of Ly (4970034). Polysulfone is inherently hydrophobic [Ly, col. 3, lines 37-51] and therefore inherently has the function of adsorption/desorption (Strano, 2003/0034295, [0095, 0128], Table F). Further, Durst teaches the movement of one component from one flow stream into another based on concentration, temperature or pressure gradients (p. 1, lines 6-19, page 3, paragraph 2), which constitutes "removal" from the first stream and "partitioning" between the two streams. Further, Durst teaches "pure physical absorption" (p. 1, lines 15-19), which at least constitutes removal, and may actually refer to adsorption.
3. With respect to claim 4, the fibers are shown as woven in Fig. 3, and therefore cross each other.
4. With respect to claims 3 and 5, new rejections have been applied.

5. Applicant's arguments filed January 31, 2011 have been fully considered but they are not persuasive.

6. Applicant argues that a drawing is not needed to understand claim 5, but in that it is not clear how such an embodiment would be made—would there be looping inside or outside the plate or a sharp foldover?—a drawing would be required to understand the limitation.

7. Applicant argues that the prior art does not teach an exposed terminal portion, but the edges of the apparatus of the prior art show exposed fiber ends, so as to permit flow therethrough. The instant claims do not require that the fiber ends extend beyond the plate, or have connectors provided thereon.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jan M. Ludlow whose telephone number is (571) 272-1260. The examiner can normally be reached on Monday, Tuesday and Thursday, 11:30 am - 8:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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